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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,734	12/18/2001	Baowei Kang	B784.312-1	8852

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EXAMINER	
NGUYEN, KHIEM D	

ART UNIT	PAPER NUMBER
2823	

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/017,734	Applicant(s) KANG ET AL.	
	Examiner Khiem D Nguyen	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-6 and 8-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-6 and 8-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

Response to Arguments

Applicant's arguments with respect to claims 2-6 and 8-14 have been considered but are moot in view of the new ground(s) of rejection.

New Grounds of Rejection

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-
(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 6 and 8-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Francis et al. (U.S. Patent 6,482,681).

In re claims 6 and 8-13, Francis discloses 6 a method for fabricating IGBT, MCT or GTO, wherein the fabrication is in the following sequence:

PROCEDURE 1: form a uniformly-doped monocrystalline n^- starting wafer (FIG. 4, 20) fabricating a nonuniformly doped n-type substrate which contains an n^- layer on the frontside of the wafer and a diffused n^+ layer (FIG. 4, 30) on the backside, wherein the diffused n^+ layer is formed in the first step of this procedure (col. 4, lines 3-40 and FIGS. 1-4);

PROCEDURE II: fabricating the frontside structure of either an IGBT, MCT, or GTO (FIG. 4) on the frontside of the substrate wherein the n^- layer is exposed (col. 5, line 47 to col. 6, line 6);

PROCEDURE III: thinning the wafer from the backside of the substrate wherein the diffused n^+ layer is exposed, by grinding and polishing, until an n-type residual diffused-layer is reserved (col. 5, line 47 to col. 6, line 6 and FIGS. 4-5);

PROCEDURE IV: forming a backside p^+ emitter layer (FIGS. 1-4, 11) by ion implanting into the backside surface of the wafer wherein the residual diffused-layer is exposed thus producing a p-n junction near the backside surface of the wafer which is composed of the p^+ emitter layer and the n-type residual diffused layer;

PROCEDURE V: depositing metals (FIG. 4, 23, 24, 25, 26) on the backside surface of the wafer wherein the backside p^+ emitter layer is exposed, followed by sintering/alloying; and after the substrate is thinned, i.e. after finishing PROCEDURE III or since PROCEDURE IV, only low-temperature processes occur at less than 600° C (30 to 60 minutes at 300 ° C. to 400° C.), (col. 5, lines 37-46).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 2, 3, 4, 5, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Francis et al. (U.S. Patent 6,482,681) as applied to claims 6 and 8-13 above.

In re claims 2, 3, 4, 5, and 14, Francis fails to disclose the ranges for the thickness of the backside p^+ emitter layer and the n-type residual diffused-layer, the implanting dose of the backside p^+ emitter layer, and the doping concentration of the n-type residual diffused-layer. However, it would have been obvious to one of ordinary skill in the art of making semiconductor devices to determine the workable or optimal ranges for the thickness of the backside p^+ emitter layer and the n-type residual diffused-layer, the implanting dose of the backside p^+ emitter layer, and the doping concentration of the n-type residual diffused-layer through routine experimentation and optimization to obtain optimal or desired device performance because the thickness of the backside p^+ emitter layer and the n-type residual diffused-layer, the implanting dose of the backside p^+ emitter layer, and the doping concentration of the n-type residual diffused-layer are result-effective variables and there is no evidence the thickness of the backside p^+ emitter layer and the n-type residual diffused-layer, the implanting dose of the backside p^+ emitter layer, and the doping concentration of the n-type residual diffused-layer are critical and it has been held that it is not inventive to discover the optimum or workable range of a result-effective variable within given prior art conditions by routine experimentation. See MPEP § 2144.05. Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising there from. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen

dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Amendment

Response to Arguments

Applicant's arguments with respect to claims 2-6 and 8-14 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
September 21, 2003

Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800